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was to decide whether the method of the 'mean gradations,' is applicable to the sensations of brightness. This method consists in presenting two disks composed of different proportions of black and white (and thus, when rapidly revolved, showing different shades of gray), and asking the observer to regulate the amount of black and white in a third disk until it was just as much darker than the one as it was lighter than the other: i.e., to find a gray of a mean intensity. Call the intensity of the darker one x and of the lighter one y , then the arithmetical mean would be $\frac{x+y}{2}$. But if Weber's law (which says, that to produce equal differences of sensation, the difference in the stimuli vary proportionately to the stimulus already present) is true, then $\sqrt{xy}$ would be the intensity that appears to be mean; i.e., $x : \sqrt{xy} :: \sqrt{xy} : y$. Dr. Lehmann's study is devoted to discovering all the sources of error in such an experiment. The order of the disks, whether the variable disk should be between the two or not; the direction and kind of illumination; the order of experimenting; and, beyond all, the effect of contrast with the back-ground against which the disks were seen, — were all taken into account. Dr. Lehmann succeeded in measuring quantitatively the effect of contrast (a very valuable result), applied a method of eliminating its effect, but finally comes to the purely negative conclusion that the question of the validity of Weber's law is not favored or refuted by his experiments. A real test still remains to be made. His most valuable result is the study of the great effect of contrast in all such work.

JOSEPH JASTROW.

*PROCEEDINGS OF THE ENGLISH SOCIETY
FOR PSYCHICAL RESEARCH.*

To allay at once any feelings of expectancy (which some readers may share with the writer whenever the green cover of a new number of these 'Proceedings' is caught sight of) it may be well to say that nothing unusually wonderful is therein revealed. A considerable portion of the number is devoted to the 'physical phenomena' connected with spiritualism. Fortunately, throughout most of the discussion the subject is strictly adhered to, and any theory of explanation involving assumptions contradictory to the principles of physical science is considered irrelevant. The issue is, in the main, considered to be whether certain strange phenomena are explicable by what we know of conjuring, mal-observation, and the psychology of belief, or whether they must be

transferred to the category of the unexplained, to be reserved for future study. Can we say 'yes' or 'no' to this alternative, and if not, which of these answers is pointed out as the more probable?

Professor Barrett opens the discussion, and at once records his conviction, "that, at any rate, some of the simpler phenomena of spiritualism are inexplicable by any causes at present recognized by science." This conviction is not due to experience gained in the ordinary public seances; that is considered as largely fraudulent, and evidently worthless. But attention is called to a few cases of private mediumship, in which all the conditions necessary for a scientific test were granted. In the first of these cases, a girl of ten years had the peculiar gift of causing raps to be heard, even when her hands and feet were firmly held; the raps occurred at certain letters of the alphabet, and displayed a childish intelligence. A word "was misspelled by raps, exactly as the child would have misspelled that word." Professor Barrett concludes that he is 'morally certain' that hallucination, trickery, or known causes had nothing to do with it, but that it belongs to a 'class of phenomena wholly new to science.' A case is then cited in which a clever boy deceived his father (a distinguished surgeon) and all his family, by pretended spiritualistic manifestations, for a whole year; but the 'radical' difference is pointed out that in this case the trick was discovered, in the former case it was not. Professor Barrett, with another private medium, saw tables move, and raps spell out 'pious platitudes,' "such as the medium herself (a Methodist) would be likely to concoct," and again considers the phenomena as inexplicable. A seance with a paid medium, Mr. Englington, added to the mystery. Whether further study will support this conviction or not, at any rate, says Professor Barrett, more light can be shed on these phenomena by occasionally assuming the possibility of the spiritualistic stand-point; theorizing is needed as well as observation.

The paper of Mrs. Henry Sidgwick reports an unusually able investigation of the so-called spiritualistic phenomena. It is the account of an observer who knows how enormous the possibilities of deception, of mal-observation, and how insidiously inference usurps the place of perception. Every one interested in the psychology of illusions should read this admirable exposition of an interesting chapter on that subject.

The phenomena to be explained include raps, levitation of objects, playing on musical instruments, pycography and so on. Mrs. Sidgwick speaks from a twelve years' experience with mediums, including several of considerable fame. As

regards raps, one must remember that as early as 1851 it was shown that these could be and were produced by voluntarily dislocating the knee-joint. Holding the knees of one of the original Fox sisters was sufficient to prevent the appearance of the raps. It will be impossible to detail the many devices to prevent fraud of which Mrs. Sidgwick availed herself; but the reading of these extends one's appreciation of the conjuring art. Perhaps the most ingenious device was that of placing the medium in a hammock connected with a spring-balance which recorded the weight of the hammock and its contents. If the medium herself personated the 'materializations,' her stepping out of the hammock would be recorded. "The seances were nearly unsuccessful until the last." In the apparently successful ones an associate was in the cabinet for a time, and broke her promise by refusing to be searched when leaving it. In short, remembering that nearly every medium who pretends to any very remarkable manifestation, has been exposed at some time of his or her career; that the conditions which they prefer are those most available for trickery; that when the conditions are rigid and unexpected, success is rare (if it ever occurs); that the kind of feats by which the spiritualists choose to prove their theories are exactly the kind which a conjurer chooses,—in view of all this, the aversion of scientific men to investigate such phenomena is largely justified. The most (perhaps the only) valuable result of this research is, as was said above, the light it throws on the psychology of belief, and, from a natural-history point of view, the willingness of a certain class of humanity to be deceived and to long and search for the philosopher's stone.

Mr. C. C. Massey contributes a paper on the possibilities of mal-observation in the evidences of spiritualism, in which he maintains that these possibilities have been greatly exaggerated, and that, if we simply take the precaution of recording one simple observation at a time, human testimony is reliable enough. Mr. Massey (who is the translator of Zöllner's 'Transcendental physics') then attempts to show, by recounting seances with notorious mediums, that reliable evidence for the existence of obscure forces exists in abundance. The former president, Mr. Sidgwick, very properly adds a note that the policy of a psychic research society, far from encouraging this not over-moral trade, should distinctly be averse to having more to do with it than is necessary.

Two papers by Mr. Frederic W. H. Myers deserve some notice. The first treats of "Human personality in the light of hypnotic suggestion," and is a very exaggerated estimate of the evidence

which this condition can furnish with regard to the nature of the eye. The main idea is, that the subject almost always resists the notion that anything but his own free choice determined the suggested action, and will invent the most fanciful explanations to make an absurd action appear rational. In other words, one may even have the feeling of acting as a free agent, and yet be constrained by a foreign agent,—a fact, by the way, well known to Spinoza. The object of the second paper is to suggest that telepathy may be operative hypnotism; that a subject may be put into this condition by the will of the operator himself a quarter of a mile or more away. The evidence produced is far from satisfactory, owing, in part, to the fact that the observers who were sent to find out whether the sleep followed would themselves unconsciously furnish the suggestion. Mr. Myers then proposes a serial classification of the methods of 'hypnogeny,' beginning with such massive disturbances as cause cataplexy in animals, and gradually leading up to this new 'telepathic' hypnotism. The scheme is in part suggestive, but is premature, and adopts as proved, facts extremely uncertain and improbable. The theoretical portion of the paper is extremely disheartening; such a sentence as "that perhaps when I *attend* to a thing, or *will* a thing, I am directing upon my own nervous system actually that same force which, when I direct it on another man's nervous system, is the 'vital influence' of mesmerists, or the 'telepathic impact' of which Mr. Gurney and I have said so much," certainly smacks of anything but a scientific spirit.

Mr. Myers, Mr. Gurney, and Mr. Podmore will very shortly give a detailed statement of their psychical researches, in a two-volume book, 'Phantasms of the living,' and to this work Mr. Myers refers readers for further information.

The present writer can not refrain from asking, if all the brains, the labor, the money, and the time devoted to these investigations by our English cousins have yielded such meagre results, and have led the way to so much useless and markedly perverted thinking, whether, as long as the world has so many important questions waiting for a decision, so much good cogitative energy should be allowed to go waste.

RECENT WORKS ON TOPOGRAPHICAL SURVEYING.

THE field work of the topographer consists of two parts, which are entirely distinct in character. These are, first, the work of location, which may be done entirely by angulation, or by angulation and distance measurements. It is geometrical